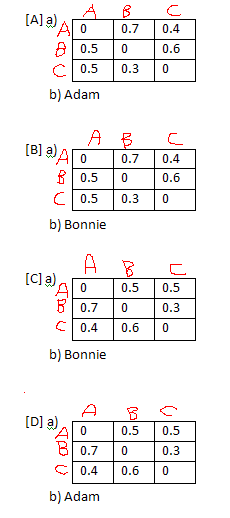
|  |
| --- |
| Three children, Adam, Bonnie, and Carlynn, are playing a game of catch. Suppose the following statements are true:   1. If Adam has the ball, he will throw to Bonnie with a probability of 0.5 and to Carlynn with a probability of 0.5 2. If Bonnie has the ball, she will throw to Adam with a probability of 0.7 and to Carlynn with a probability of 0.3 3. If Carlynn has the ball, she will throw to Adam with a probability of 0.4 and to Bonnie with a probability of 0.6    1. What is the associated matrix of probability?    2. Suppose Bonnie has the ball now. Who is most likely to have the ball after two tosses? (Hint: multiplying the matrix in a) will yield a matrix of probabilities for who has the ball after two tosses.) |

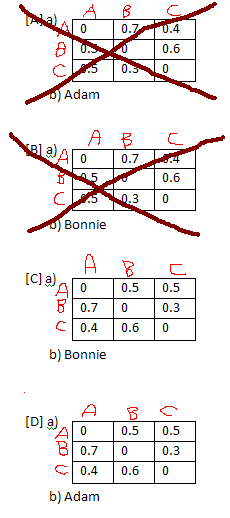
To solve the given problem, you must first figure out which two matrices are obviously not possible answers. To determine which matrices are possible answers it is easier to look at the matrices when they are labeled: (A represents “Adam”, B “Bonnie, and C “Carlynn)



The decimal number within the “matrix” represents the probability that one of the three children will have the ball thrown to them. This is where statements one two and three come into play;

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| 1. If Adam has the ball, he will throw to Bonnie with a probability of 0.5 and to Carlynn with a probability of 0.5 2. If Bonnie has the ball, she will throw to Adam with a probability of 0.7 and to Carlynn with a probability of 0.3 3. If Carlynn has the ball, she will throw to Adam with a probability of 0.4 and to Bonnie with a probability of 0.6 |

We know that when Adam has the ball he will throw to Bonnie with a probability of 0.5 and to Carlynn with a probability of 0.5; this tells us that matrix A and B are not possible answers:

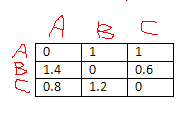
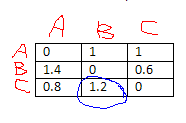


Next, you must figure out part b. of the question, you are given a hint on how to do so.

Using your calculator press:

2nd then,   
x-1 then,   
move over to EDIT,   
Create a 3 x 3 matrix and enter the numbers from the matrix in part a (Matrix [C] or Matrix [D])   
Return to the home screen of your calculator and enter the number 2 (representing two tosses of the ball) and multiply it by the matrix that you have created.

You should come up with a matrix that looks like this:

  
  
  
  
  
To determine who will have the ball, look at the bottom row of the matrix.   
The cell with the highest number (1.2) represents who will have the ball (Bonnie).   
  
  
This makes the correct answer:   
Matrix [C]

